

**Impact of zoning-based planning systems on housing
affordability for the urban poor: The case of Kigali city,
Rwanda**

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Abstract

In Africa, the linkages between zoning planning and housing affordability have not been adequately assessed. Elsewhere, significant amount of literature have discussed the effects of strict land use regulation on housing, with a large part of them converging on the strong correlation between zoning strictness and inflating house costs/prices. Where zoning system has been in force for a long time like in the United States, it has been often labelled as exclusionary due to how it limits the poor to access housing. With zoning being at the heart of the current planning system in Rwanda, this research aims at examining these linkages in an emerging urban setting like Kigali city. This study employed mixed-method approach to assess how the master plan and zoning requirements affect housing cost and the ease of access to housing for low-income households. Results reveal a total house supply gap of 30,000 units between 2012-2020 of which more than a half is affordable housing. While zoning code requires the use of largely imported materials which increases the cost of housing, more than 70 per cent of residents earn too minimal income to qualify for formal mortgage loans. Therefore, the case of Kigali city emphasizes the mismatch between zoning assumptions and underlying social and economic conditions. Moreover, the euphoria to meet master plan objectives encourages conversion of prevalent informal settlements into high-end market neighbourhoods overlooking the negative impact on housing affordability. This study suggests relaxation of zoning regulations for certain income thresholds, re-defining affordability to match the local context and generating housing affordability indexes regularly to inform government's urban housing strategies.

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Declaration

No portion of the work referred to in the dissertation has been submitted in support of an application for another degree or qualification of this or any other university or other institute of learning.

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1. INTRODUCTION

1.1 BACKGROUND TO THE STUDY

The global research in planning and urban geography has been concerned with establishing the relationship between zoning regulations and the affordable housing problem (Harney, 2009; Glaeser & Gyourko, 2003; Monkkonen, 2013). Researchers argue that excessive land use restrictions may increase house prices and hence make it harder for urban communities with limited income to access decent housing (Monkkonen, 2013). Despite being widely regarded as a social merit (Leishman & Rowley, 2012), access to housing remains a crucial challenge for a significant number of urban populations. The latest report on world cities development estimates 881 million people currently living in slums in developing countries (UN-HABITAT, 2016). Similarly, same report argues that 1.6 billion people will face housing deficiencies by 2025 (UN-HABITAT, 2016). In this respect, in the efforts to examine the potential causes of the housing problem it has been regarded by various scholars as important to trace the link between the strictness of zoning-based planning and declining levels of housing affordability (Lai & Chung, 1994; Fischel, 1995; Lens & Monkkonen, 2015).

At the same time, the last few decades have seen many developing countries undertaking policy reforms which gave way to modernist planning approaches mostly involving master plans and zoning regulations in attempt to control urbanisation (UN-HABITAT, 2009). To this end, the common reason for adopting zoning in many contexts has been often described as the acknowledged need to reorganise urban spaces into well planned and segregated land uses and to increase land productivity by integrating mutually beneficial land uses (Lai & Chung, 1994; Fischel, 1995). There is also a belief that such an approach can also offer practical solutions against

common urbanisation challenges such as proliferation of informal settlements and urban sprawl particularly in cities of the global south (Njoh, 1995).

However, the fundamental problem with zoning regulations has been allegedly its tendency to exclude urban low-income communities by imposing minimum housing standards out of their reach (Harney, 2009). For instance, in countries where such principles are highly popularised as the United States, zoning approach to planning has been described as exclusionary and increasing the cost of housing (Ikeda & Washington, 2015). To this end, Glaeser & Gyourko (2003), in their study appraising the impact of building restrictions on housing affordability across US cities, demonstrated a close relationship between measures of zoning strictness and high land prices and housing costs. More recent investigations have also endorsed this correlation. Furthermore, Harney (2009) in his study examining zoning effects on housing supply established that zoning regulations significantly stimulate an increase in land prices by restricting delivery of additional land in the formal market.

In regions of the global south¹ such as Africa, there is a gap in scholarship work linking the use of zoning and the housing problem. However, the propagation of zoning across the continent is extensively discussed essentially as a colonial legacy (Njoh, 1995; Njoh, 2003; Berrisford, 2014). Njoh (1995) argues that in many parts of sub-Saharan Africa zoning ordinances date back to the colonial era and even those enacted in more recent years simulate those in force in high-income countries. Therefore, Watson (2009a) adds that planning objectives are often set irrespective of the

¹ By using this concept I refer to those regions of the world that are considered to be lesser developed in terms of urbanisation and industrialisation (Tyner, 2015). Terms 'global south' and 'developing world' are used interchangeably throughout the dissertation.

underlying social and economic context, which in turn leads to reverse results. To this end, failure by planning policies to accommodate the way of life for various income groups can cause severe housing shortages for certain income thresholds.

In the case of Kigali city in Rwanda, master plan and zoning ordinances are in operation since 2012. Most of the urban planning and development frameworks for Kigali city have been inspired by Singapore² planning system. The latter is widely referred to as a 'planning model' in relation to effective land use regulation and growth control (Shatkin, 2014). With Kigali vying to be the next Singapore of Africa, this reveals how much foreign planning cultures have shaped the local planning system under the so-called 'model cities' umbrella. Nevertheless, the credibility of urban policy tourism has been massively critiqued (Gonzalez, 2011; Healey, 2013). Gonzalez (2011) pointed out that transfer of best practices in planning has often taken place through international exchanges between professionals and administrators. Yet, it is strongly argued that transfer of urbanism models from one context to another does not necessarily translate into anticipated results (Nasr & Volait, 2003).

The city of Kigali considers strict land use regulation as a viable solution against spontaneous urban growth and for efficient use of land. As has been shown however, enforcement of the master plan and zoning is hypothetically regarded as a major contributing factor to the shortages of affordable housing. In this way, various authors acknowledge two major ways zoning may affect affordability: (1) By imposing compliances standards pertaining to height, density and amenities they make the overall building costs too high or

² Singapore is a city-state and in most of the cases I refer to Singapore as city in discussions.

alternatively they lead to higher prices of finished houses (Malpezzi & Mayo 1997; Mayer & Somerville 2000); (2) In the presence of weak institutions, strict land use regulation can cause speculation and other market irregularities which constrains new housing development and hence render supply inelastic (Biderman, 2008; Mayo & Angel, 1993). These being the potential links between zoning and affordability, under this research I intend to assess them thoroughly by drawing on Kigali city as a case study.



Figure 1.1: Artistic impression of a residential area near the CBD as per Kigali Master plan (OZ Architecture, 2007)



Figure 1.2: Current look of an area of the CBD and planned residential neighbourhood in rear right side (Snidjers, 2015).

1.2 AIMS, OBJECTIVES AND RESEARCH QUESTIONS

A considerable amount of scholarly work has disclosed a close link between the use of master planning and zoning and subsequent high house prices and spatial segregation of low-income urban communities (Lai & Chung, 1994; Hui & Ho, 2003). Most of the existing literature, however, examines this relationship with a focus on developed countries mostly North America and Europe (Glaeser & Gyourko, 2002; Leishman & Rowley, 2012). In Africa, a majority of research in this area focused on the post-colonial degenerative forms of planning and their impact on the wider socio-spatial fabric of cities (Okpala, 2009; Watson, 2009a; Watson, 2009b). There is, however, a noticeable gap in knowledge on the linkages between zoning-based planning systems and the housing problem in the global south and particularly in Africa.

This dissertation responds and contributes to the current debates on the interface between modern planning and availability of low income housing by examining ways in which enforcement of zoning regulations and provisions of the master plan currently in force in Kigali city affect housing affordability, particularly for low and medium-income households. The objectives of this dissertation are:

1. To investigate how the changing regulatory and policy context facilitates (or constrains) provision of affordable housing;
2. To assess the extent and nature of affordable housing shortages in Kigali city;
3. To examine the potential effects of implementation of the master plan and zoning regulations on high housing costs.

To reach the objectives, this study will first discuss concepts of regulatory planning and affordable housing in efforts to understand various forms of regulatory planning and how they relate to the general problem of affordable housing. In this regard, the main research questions of this study are:

1. How have major changes in planning policies and laws affected provision of affordable housing in Kigali city?
2. What is the current situation of affordable housing in Kigali city?
3. How does enforcement of the master plan and zoning regulations affect housing affordability across the city of Kigali?

1.3 STRUCTURE OF DISSERTATION

This dissertation is structured as follows. Chapter 2 presents the literature review. This chapter briefly discusses the major planning systems, how planning ideas travel across different cities and particularly, it focuses on regulatory planning systems and their effects. Towards the end, this chapter also discusses the problem of affordable housing from global and regional contexts.

Chapter 3 covers the methodology and is divided into several sections. Section 1 covers the conceptual framework, which includes a synthesis of the reviewed literature and operationalisation of theoretical constructs. Section 2 covers the overall research strategy, followed by sections on data collection and analysis methods. The last 2 sections cover ethical considerations and reliability, validity and research limitations.

Chapter 4 comprises 2 sections. First section overviews descriptively the case study, while section 2 encompasses the presentation of findings and analysis. The latter is structured around 4 themes, which allow a detailed analysis of the hypothesised links between zoning and affordability outlined earlier. Theme 1 covers policy and regulatory frameworks. Theme 2 explores the house market situation in Kigali. Theme 3 assesses linkages between master planning and zoning and high housing costs/prices. Finally, Theme 4 encompasses the analysis of socio-economic conditions within Kigali.

Chapter 5 covers the conclusion. This part provides a summary of the dissertation; the relevance of the empirical and theoretical frameworks and finally, it ends with recommendations for further studies.

2. LITERATURE REVIEW: REGULATORY PLANNING SYSTEMS AND AFFORDABLE HOUSING

2.1 INTRODUCTION

This chapter draws on previous studies such as Harney's (2009) to provide a detailed discussion on regulatory planning systems and dimensions of the affordable housing problem. This chapter has three aims. First, it explores the meaning of various concepts related to regulatory planning and zoning systems. Second, it offers a brief discussion of the potential problems associated with their implementation. Third, it aims to understand how the literature discusses the nature and scale of affordable housing problem.

2.2 MAJOR PLANNING SYSTEMS

The evolutionary meaning of planning alongside its broad range of application is attributed to its embeddedness in the legal, socio-cultural and political settings. As the latter vary extensively, so do planning practices. To this end, Healey & Williams (1993, p.702) contend that planning have always progressed in relation to: (1) context-specific legal principles and institutional structures and cultures, (2) the relative role of the state, private and civil society in development direction, (3) and lastly the context of professional planning society in different areas. Such diversity is further reflected in different terminology associated with planning concept such as: physical planning, spatial planning, urban planning, development planning, etc. In a broader sense, Healey (2010, p.1) views planning as: *"a field primarily concerned with management and development of relations between place and people"*. Therefore, planning puts emphasis on shaping places into patterns that support the growth of coherent communities.

Countries have always had different motives for choosing a particular planning orientation. For example, it is argued that in some instances planning systems evolve in relation to government priorities (Healey, 2010), while in others their evolution simply follows traditional development trajectories (Newman & Thornley, 1996). Newman & Thornley (1996) suggests a classification of three major planning systems namely: regulatory, discretionary and hybrid systems. In line with this, some countries like Germany, the US and France are known for having regulatory planning systems built on strict zoning regulations, unlike the United Kingdom which prefers a more liberal and flexible system grounded on administrative discretion in relation to planning decision-making (Booth, 1995). In many cases, however countries seek to maximise the benefits of both principles to form planning systems that are more suitable to

local urban environments, hence leading to formation of more hybrid-planning systems (Newman & Thornley, 1996).

Given that the city of Kigali follows master planning and zoning which form part of the regulatory planning principles, this dissertation focuses on regulatory planning system and attempts to explore the wider scope of its use and its effects on housing affordability from a global and case study perspective. However before that, following section briefly discusses the transfer of planning cultures widely regarded as a major foundation of planning systems.

2.3 TRANSFER OF PLANNING CULTURES

It is widely argued that the world has known a massive urban transformation during 20th century (Watson, 2009a). One of the key responses to urban phenomena noted during the course of this period involves diffusion of planning ideas across different regions and cities. Under influence of colonialism, globalisation and intellectual exchange, cross-border mobility of planning ideas became increasingly a common practice (Healey, 2013). With cities seeking to be globally competitive, borrowing envied ideas from relatively advanced planning traditions has been often seen as a viable solution. From a wider geo-political context, travel of planning practices is also highly attributed to the growing role of regional cooperation and multi-national organisations (Watson, 2009b). In this case for example, (Gonzalez, 2011) points out the role of organisations such as EUROCITIES and UN HABITAT, in the propagation of the so-called 'Barcelona model'.

Against this background, exchange of planning cultures is largely echoed in number of scholarship work. For example Yuen (2007) argues that the Singapore planning system was inspired by the London's garden city; whereas Illas (2012) contends that Barcelona's early urban reforms are widely similar to Paris' Haussmann plans. In the global south, such shifts have also taken place particularly in the shadow of colonialism. Berrisford (2014) discusses that initial plans in most of colonial African cities largely reflected those of the former ruler's capital cities. However, Nasr & Volait challenge this idea,

A high degree of complexity is noticed in the ways models of urbanism are imported and exported. Depending on the local context, the balance of power and other factors, these different types of urbanistic exchanges can result in contradictory relations between actors, structures, objectives and, consequently, urban forms. (Nasr & Volait, 2003, p.14)

In recent years, the import and export of planning practices has attracted major critiques (Nasr & Volait, 2003; Healey & Upton, 2010). Most of these focus on how imported planning ideas, usually in form of popularised 'model city' concepts, impact areas of destination (Nkubito, 2016). To this end, the common argument has been that borrowing planning ideas is sometimes inappropriate and essentially does not always lead to similar success (Healey & Upton, 2010). For example in Africa, it is argued that there is tendency for new planning regulations to conform to foreign compliance standards in terms of zoning, building materials, urban design etc., that are too expensive to the majority citizens and to some extent culturally irrelevant (Njoh, 1995; Berrisford, 2014)

The ambition to embrace modernity is considered as an important motive behind many African cities admiration of foreign planning models (Vainer, 2014). However, even in developed traditions where these models prevailed for a long time, institutions and urban environments have changed substantially (Watson, 2009a). Therefore, in rapidly changing political and social contexts like Africa's, such blind import of foreign planning practices would rather be seen as vague and often based on unrealistic assumptions.

2.4 REGULATORY PLANNING SYSTEM

Regulatory planning is defined as rights and conditions set out in the zoning plan, along with legal requirements pertaining to the process of allocating or changing land-use rights, buildings and space use. (UN-HABITAT 2009, p.11)

Also known as 'master planning' or 'zoning-based planning', regulatory planning often involves production of plans providing detailed outlook of the urban fabric and the envisioned future of a city under different types of plans (UN-HABITAT, 2009) (see table1). These plans are primarily enforced through legally binding zoning ordinances. Healey & Williams (1993) indicate that under zoning systems property owners are provided with right to develop land according to plans and building standards. As a result, in most of the cases planning decisions are taken in form of legal acts (Booth 1995).

In recent years, many countries have based their admiration for regulatory planning principles such as master plan and zoning on different experiences. For example Singapore values these principles on the basis of ensuring efficient allocation of scarce land resources (Goldblum, 2008); whereas Rwanda views master planning and zoning as the most efficient way to control development and to tackle informal settlements (City of Kigali, 2013).

Table 2.1 Different types of urban plans under regulatory planning

Type of plan	Description
Master plan	Master plan These are spatial or physical plans that depict on a map the state and form of an urban area at a future point in time when the plan is 'realized'. Master plans have also been called 'end-state' plans and 'blue-print' plans.
Comprehensive plan	Reflects the belief that the planning system should plan towns (or large parts of them) as a whole and in detail. In the past, this term also suggested that wholesale clearance of the existing city should occur in order for the new comprehensive plan to be realized.
Comprehensive City Plan	Term used in China to describe an urban master plan (1989 City Planning Act).
General plan	Another term for a master plan, indicating uses and building norms for specific plots. Usually underpinned by a zoning system.
Layout plan or local plan	These are physical plans, often at a local scale, depicting details such as roads, public spaces and boundaries.
Destination plan or building plan	A plan for a specific area where substantial change is anticipated, usually in the context of a wider strategic or 'structure' plan or 'scheme'.
Strategic spatial plan	The terms 'structure plans' and 'strategic plans' are closely related, and the latter term is now more commonly used. A strategic plan is a broader-level selective (or prioritizing) spatial plan, usually showing, in a more conceptual way, the desired future direction of urban development. Particular decision-making processes accompany the production of a strategic plan.
Directive or development plan	A more generic term referring to structure or strategic plans.
Land-use zoning	Detailed physical plans or maps showing how individual land parcels are to be used, and assigning to the landowner (which may also be the state) certain legal rights and conditions pertaining to the use and development of the land. Ideally the zoning plan aligns with the master plan.

Source: Adapted from (UN-HABITAT 2009, p.11)

Zoning planning initially originated from Germany and has quickly spread across European countries such as France and Spain and North America in the early 20th century (Hall, 2002 in Fox & Goodfellow, 2016). As urban modernist ideals became popular across Europe, zoning was largely considered as key tool to take this concept further (Watson, 2009a). However, the same tool was also used against the general planning objective of creating inclusive urban spaces, to keep marginalised communities out of the city (Fox & Goodfellow, 2016).

In this case, UN-HABITAT (2009) argues that following the demographic transition and industrial revolution, master planning and zoning ordinances were enthusiastically received among European middle and wealthy business classes, who utilised them to maintain property prices and to exclude undesirable social classes from the city. Similarly, zoning was popularised across the US and is tailored in the country's legal and administrative settings. To this end, Booth (1995) contends that in the US zoning principles, reflecting the values enshrined in the constitution, recognise rights of individuals to know permitted uses on landed assets and rights to distinguish between private and public rights.

Under master planning and zoning urban form is shaped by a concern with aesthetics (order, harmony, formality and symmetry); efficiency (functional specialisation of areas and movement, and the free flow of traffic); and modernisation (slum removal, vertical or tower buildings, connectivity, plentiful open green space). (Watson 2009b, p.2261)

In modern times, various planning systems have taken a more entrepreneurial orientation under influence of globalisation and neo-liberalism (Watson, 2009b). At the same time, where countries seek to build more dynamic planning styles, planning powers are strategically decentralised with planning responsibilities being

collaboratively undertaken by the state, private sector and civil society organisations (Friedmann, 2005). In this respect, for a long time zoning planning has been a common approach through which developed countries implemented ambitious plans for their cities as strategic nodes for national and regional economies.

The central principle of regulatory planning is to impose control measures over the built environment through legally bound land use regulations or zoning ordinances (Fox & Goodfellow, 2016). Zoning regulations support separation of land uses as a way to achieve better liveability. From a technical point of view, Lai & Chung (1994) describe zoning to be conceptually a process involving clustering of activities in groups or land use zones (i.e. residential, commercial, industrial, etc.) and spatially arranging these zones in a way that maximises efficiency and prevents interference of non-compatible uses.

Under regulatory planning system, it is commonly argued that planning decisions are made with certainty and absolute decision (Kayden, 2004). Thus, such system ensures predictability on what could be permitted or not on land with developers, landowners and other actors in the built-environment given more confidence prior to planning permission. In addition, it is argued that the statutory nature of this system enables landowners or any third party to challenge planning decisions made against them in court of law (Kayden, 2004). Eventually, this system is deemed to bring transparency in land market operations and renders planning decision-making more straightforward.

2.4.1 Problems with regulatory planning system

Zoning planning systems are largely controversial in developing countries, less so than they are in developed ones. In this case, UN-HABITAT (2016) contends that much of existing urban regulations such as building codes and zoning in developing world reflect colonial heritage while others work in favour of elite and wealthy classes. Reflecting on the focus of our discussion on the global south, there has been more scholarly work discussing issues associated with regulatory planning systems in this region (Beall & Fox, 2009; Watson, 2009b; Berrisford, 2014). Generally, this work suggests that such planning systems lead to spatial exclusion of urban low-income communities and inflated land and house prices.

1. Spatial exclusion

In the efforts to address rampant informalities present in most of the cities of the global south, governments often tend to adopt strict planning frameworks alongside compliance standards (Berrisford, 2014). Although the intention behind adoption of such planning orientation may sometimes seem fair, its use in these urban contexts is largely criticised in different studies (Okpala, 2009; Watson, 2009b). For instance, in a study undertaken in 9 cities across the global south, Devas (2001) found that planning regulation and building norms in most of these cities were not favouring the poor, despite constituting a substantial number of urban dwellers. In a related statement, the 2009 UN-Habitat report on human settlement echoes this issue,

The most obvious problem with master planning and urban modernism is that they completely fail to accommodate the way of life of the majority of inhabitants in rapidly growing, largely poor and informal cities, and thus directly contribute to social and spatial marginalisation. The possibility that people living in such circumstances could comply with zoning ordinances designed for relatively wealthy European towns is extremely unlikely. (UN-HABITAT, 2009, p.12)

Against this background, it is clear that enforcing zoning regulations does not guarantee controlled urban growth. In contrast, it is suggested that where a city authority strictly enforces zoning ordinances, it is likely to cause more chaos (Fox & Goodfellow, 2016). With the most likely result being peri-urban sprawl as the urban poor fail to meet the housing costs within the city (UN-HABITAT, 2009). Therefore, in urban settings where people fail to meet the cost implication of zoning requirements, there is a tendency to pursue cheaper housing options at the periphery out of the master plan and zoning enforcement boundaries.

The main problem with modernist regulatory planning approach is *de facto* exclusion of the urban poor. With urban design given greater emphasis, adopted compliance standards under such systems favors the type of housing only benefiting the minority elite and wealthy while leaving the rest out of the city's formal growth process (Berrisford, 2014). Similarly, part of the problem have been also the conflicting rationalities between the state and market (Watson, 2009a). In relation to this, Watson writes,

[...] Urban space is also increasingly shaped by the workings of the market and the property industry in cities, which may align with urban modernist visions of city governments, but which do little to benefit or include the poor. (Watson 2009a, p.2260)

In this way, where governments support market-oriented urban planning there is tendency to apply police power such as expropriation of informal settlements widely inhabited by low-income households in favour of high-end housing required by plans (Goodfellow, 2013). Also under this system, over-regulation of the market can shift profitability towards high-end housing, hence squeezing developers away from affordable housing. To this end, in a study carried out in Malaysia, Malpezzi & Mayo (1997) found that enforcement of land use regulations raised the housing costs by 30 per cent and the same study argues that lengthy housing construction approval procedures further impeded housing delivery.

2. Increased land and housing prices

Urban growth controls emerge as different measures and regulations depending on jurisdiction. Such regulations may restrict building height, floor area ratio, building materials, etc. (Kayden, 2004). Growth controls are often passed on the grounds of ensuring efficiency, safety and health. Nevertheless, Angel (2000) claimed that some governments in developing world adopting these measures are rather obsessed with modernity. This is further demonstrated by how planning policies in this region romanticise high-rise housing vastly taken as the symbol of modernity (Angel 2000; Buckley, 2014).

In practice, imposing zoning and growth controls could limit the capacity of urban residents with limited income, who heavily rely on locally available materials and incremental mechanisms to build their houses (Njoh, 1995), by introducing restrictive land use regulation which potentially reduce supply of land and new housing. Although such measures may seem to control land development, other growth factors such as migration can be hardly controlled by

the same actions. Therefore, such imbalance often results into acute housing deficits.

There are plenty of studies linking high housing prices and imposition of growth controls (Glaeser & Gyourko, 2003; Quigley, 2007; Greene et al., 2016). As in the global south, a similar observation is maintained in developed world. For example Fischel (1995, p.232) while trying to establish that relationship in the state of California following important planning law reforms in 1960s, concluded: "*house prices have risen faster in California than any other part of the US and they have reached the highest record in recent years*". As a result, this went beyond being an affordability issue to cause major economic disturbances (Fischel, 1995). In a different study with similar objective, Glaeser & Gyourko (2003) also indicated that zoning and land use controls were responsible for the rising house prices across some cities of the US in early 2000.

2.5 AFFORDABLE HOUSING

2.5.1 Defining affordable housing

In recent years, the affordable housing issue has topped the agenda of many governments as they strive for alternative mechanisms to shelter the growing urban population. Similarly, the increasing importance of affordable housing has attracted interests of many authors in defining this concept (Hulchanski 1995; Stone 2006; Gan & Hill 2009) and the UN Habitat has provided a more comprehensive definition of what should be regarded as affordable housing.

Affordable housing is broadly defined as that which is adequate in quality and location and does not cost so much that it prohibits its occupants meeting other basic living costs or threatens their enjoyment of basic human rights. (UN HABITAT, 2011, p.10)

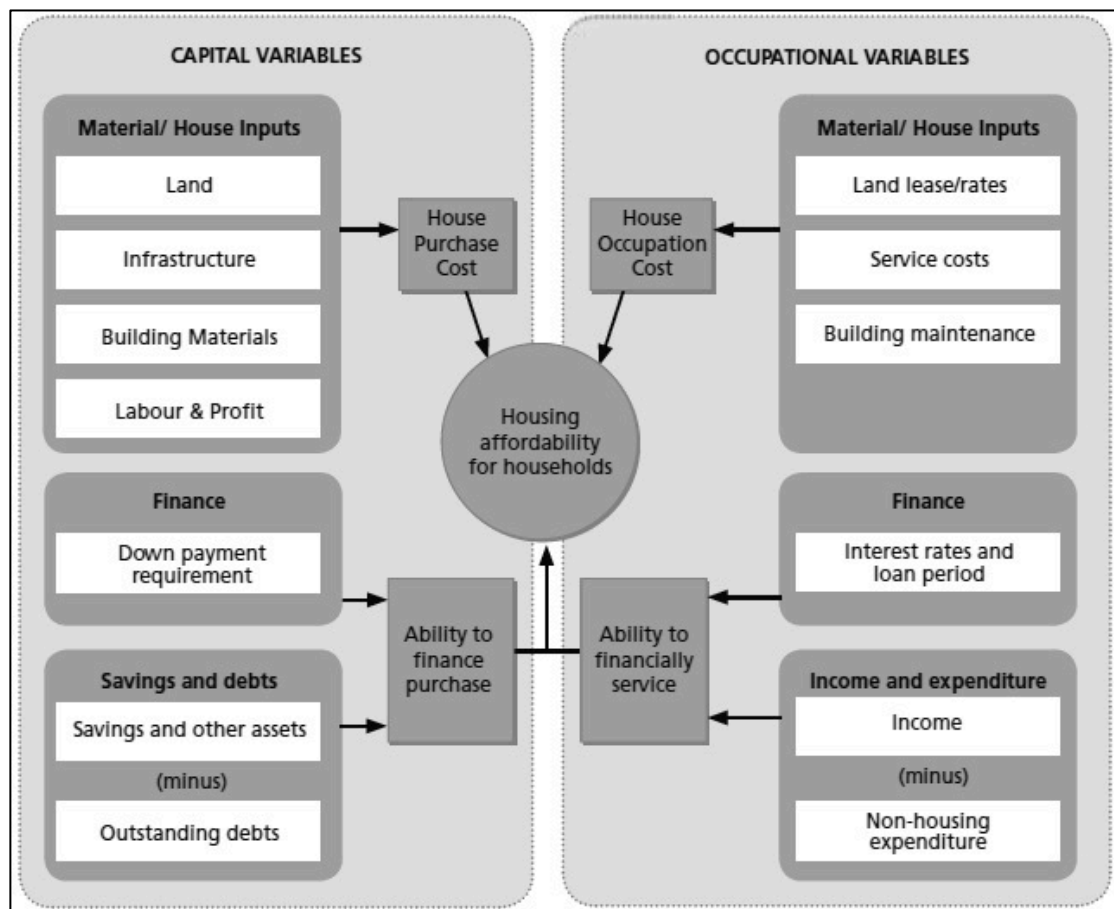
Generally, it is suggested that defining affordability mainly encompasses two elements (Woetzel et al., 2014). One is the share of income allocated to housing and secondly the minimum standards for socially acceptable housing prototype within a particular context. Housing costs to household incomes ratio has been the most used indicator of housing affordability. For example, Woetzel et al. (2014, p.1) referring to affordability state: "*housing costs should consume no more than 30 to 40 per cent of household income*". Similarly, Smets et al. (2014) in their definition, indicate that housing expenditure-income ratio should range between 25 to 30 per cent.

On the other hand, the use of affordability concept is occasionally ambiguous when associated to various income groups (Stone, 2006), where for some people affordability is viewed as subjective. However, Smets et al. (2014) emphasize the need to adapt the affordability criteria to particular contexts. With this in mind, this study focuses on affordability for the urban poor.

The use of housing costs to income ratio has attracted many critiques (Hulchanski 1995; Stone 2006; UN HABITAT, 2011). In this case, it is strongly argued that indicators used by this method do not respond adequately to the true incidence of housing affordability problems (Leishman & Rowley 2012). While urban policy makers have often relied on housing expenditure-income ratio method due its simplicity (Hulchanski 1995), Stone (2006) contends that this method is a 'rule of thumb' and hence its validity is limited.

Against this background, UN HABITAT (2011) suggests that affordability should be expressed in terms of a broad range of inputs affecting purchase cost and ability to finance the purchase rather than being a simple conception of housing costs over income. As shown in the diagram below (figure 2.5), affordability is also affected by both capital variables such as cost of infrastructure, land, labour and access to finance and occupational variables like land leases, net housing expenditure and interests rates on mortgages, which are not adequately captured in the traditional expenditure-income ratio method.

Figure 2.1 Basic components of housing affordability



Source: Adapted from (UN HABITAT 2011, p.10)

This being the case, more rigorous methods to measure affordability have been recommended such as residual income assessment and incremental affordability (Smets et al., 2014). Under this study, therefore, I suggest the working definition for affordability as the households' ability to meet expenses for decent housing in accordance to the locally accepted standards in terms of quality without affecting their routine capacity to meet non-housing needs. To this end, subsequent sections draw on this discussion to explore the affordable housing problem, how it is defined in the case study context and how it links to zoning.

2.5.2 Affordable housing problem in global context

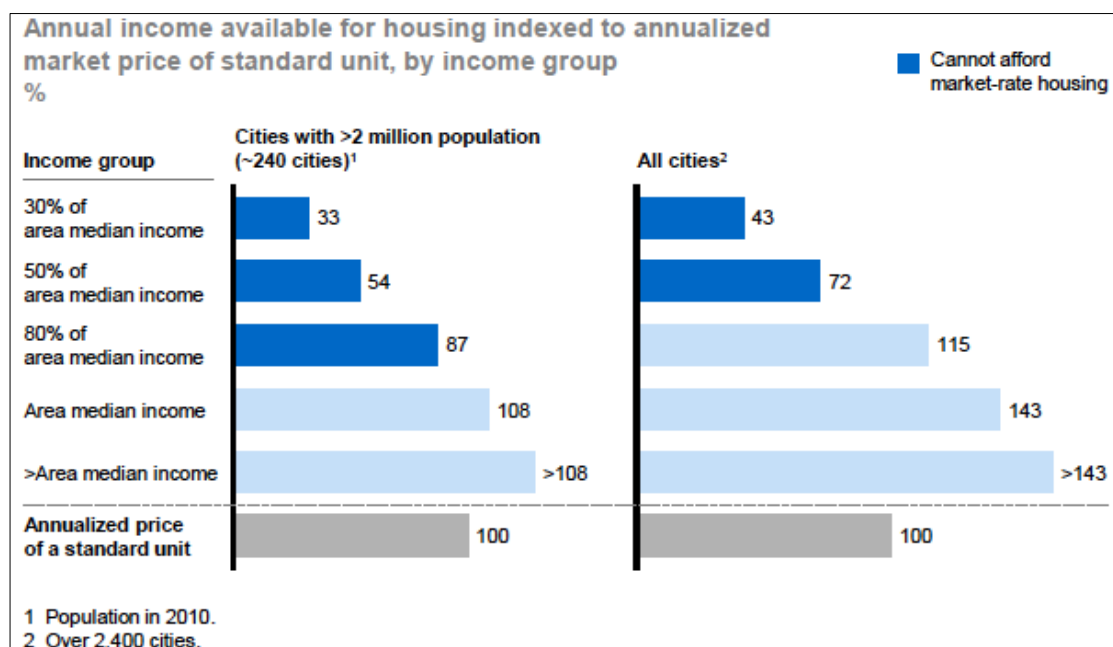
Access to convenient and affordable housing is viewed as fundamental to supporting people's welfare and allowing economies to function properly (UN Habitat, 2009). The affordable housing concept matches welfare ideas incorporated in many planning policies in the North (Leishman & Rowley, 2012) as well as across the global south (UN HABITAT, 2011). Therefore, given a primordial role that housing occupies in household consumption, the welfare is assumed higher if all households can access decent and affordable housing (Whitehead, 2007).

Similarly, this could be explained by the fact that a slight rise in house prices or rents heavily affects households' way of living. Allied to this, Leishman & Rowley (2012) indicate that high housing costs can aggravate vulnerability of low income households and lead to housing-induced poverty. The latter concept is mainly used in situation of households who cannot afford a substantial level of non-housing goods and services after meeting housing expenses (Leishman & Rowley, 2012). In line with this, Quigley & Raphael (2004) claim that while the average household would spend approximately a quarter of their income towards housing expenditures, the poor usually spend half of their income on housing. Whitehead summarises this as follows,

The household income levels are distributed unevenly. Low-income households may be left unable to afford necessities even after securing the minimum available quantity and quality of housing given the price and rent level will be set by the demand from the majority of households in society. (Whitehead, 2007, p.381)

In this context, it is incontestably known that access to affordable housing is a global challenge. UN Habitat argues that a quarter of the world’s urban population lives in slums (UN-HABITAT, 2013). With many of the urban poor households being financially limited in terms of meeting costs associated with quality housing as required by standards, a higher number of slum dwellers is projected in the future (UN-HABITAT, 2016). Consequently, more livelihoods of urban low-income communities will continue to be particularly threatened by the on-going housing crisis. In a study undertaken in 2,400 cities across the world, Woetzel et al. (2014) indicated that in cities with a population of more than 2 million even average-income household can not afford housing in the formal market (figure 2.6). As a result, this forces a substantial number to pursue informal and sub-standard housing.

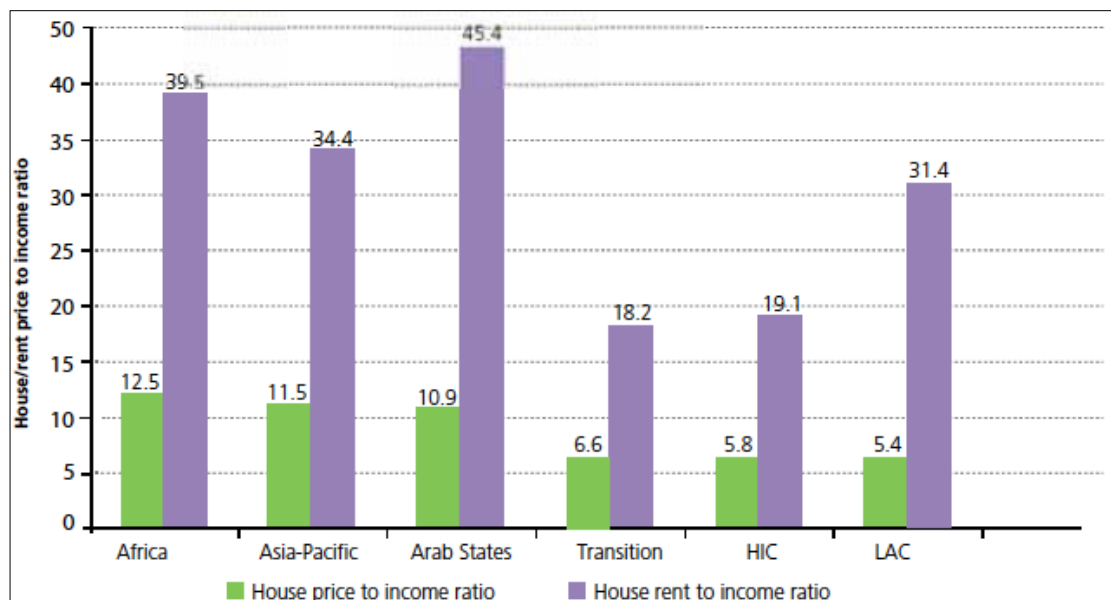
Figure 2.2: How affordability affects different income groups across cities



Source: Adapted from Woetzel et al. (2014, p.29)

The affordable housing problem varies in nature and magnitude depending on the region. For instance in Africa, currently the fastest urbanising region (UN-HABITAT, 2016), the projected urban growth is most likely to extend the existing wide gap between demand and supply of housing. Lack of alternative mechanisms to provide adequate and affordable housing constitutes a significant challenge in most of African cities. Therefore, while 85 per cent of the continent’s urban population cannot afford housing from formal market, the key elements affecting housing cost such as land and finance are too expensive for the majority (UN HABIAT, 2011). In addition, of all other regions Africa holds the highest house price-income ratio of 12.5, whereas rent-to-income ratio of 39.5 is second highest after Arab states (figure 2.7). In the latter case, affordability gap is evidently very high in Africa compared to other regions.

Figure 2.3: House price-income ratio and rent-income ratio in cities in different regions



Source: Adapted from (UN HABITAT, 2011, p.25)

HIC: High Income Countries

LAC: Latin America and Caribbean

In Africa, access to adequate housing for the urban poor is limited by high costs associated with housing. On the top of traditional factors affecting affordability, namely-land, finance, building materials and labour, there is also the problem of planning policies and land use regulations, which render access to housing more expensive. In line with this, UN HABITAT (2011) contends that building standards and land use regulations conformed to developed countries standards are often against the use of widely available and cost-effective building materials. Given the rapid urbanisation in this region, it is deemed important to explore how this together with zoning policies affect the affordability for both renters and first homeowners with low and moderate income.

This chapter has reviewed concepts of regulatory planning systems and affordable housing. Literature on regulatory planning suggests that these systems can exist in various forms with the most common involving master planning and zoning. At the same, it was revealed that where such planning approach is applied, it could potentially lead to increased house costs and spatial exclusion of the poor from the city. On the other hand, literature on affordable housing has provided a variety of definitions and has exposed limitations to measuring affordability. However, a working definition was also suggested to serve as a basis for further discussions. In addition, the problem of affordable housing was reviewed from global and regional contexts. In Africa, this problem is clearly more pronounced than in other regions, especially with the existing planning systems thought to be a major contributing factor. Following chapter provides a framework of theories and concepts linking zoning and affordability and the same framework will be applied to analyse these linkages in the case study context.

3. METHODOLOGY

3.1 INTRODUCTION

This chapter contains sections on conceptual framework, research strategy, methods of data collection and analysis and lastly a section on reliability, validity and research limitations. Data for this dissertation was collected via participant observation, textual analysis and it applies mixed-methods approach to analyse qualitative and quantitative data.

3.2 CONCEPTUAL FRAMEWORK

3.2.1 Dimensions of housing affordability

As discussed in the previous chapter, in general, housing constitutes the principal consumption in most poor households' budget allocation. Failure to meet housing costs whether in terms of rent or new purchase can heavily affect people's well being and hence lead to decreased affordability. Hulchanski (1995) argues that housing affordability problem occurs when a household pays more than a specific percentage of its income to access decent housing. Therefore, when housing becomes less affordable it primarily affects those with limited income.

As shown, affordability can be measured by analysing a wide range of indicators. For example, Quigley & Raphael (2004) suggest: housing prices, housing quality, the distribution of income, the ability of households to borrow, political and economic conditions affecting the supply of new housing and households' choice about how much to spend on housing vis-à-vis other goods. Under this section however, I intend to frame discussions on the concept of affordability around three factors namely: the quality of housing, price/cost of housing and households income.

1. Quality of housing

A house represents an important asset and a source of wealth across many societies. In addition, access to quality housing can be expensive. The quality of housing and prices normally tend to vary proportionally, which in turn renders acquisition of standard housing generally less affordable. First home-buyers often face a necessity to acquire external funding in forms of credit or subsidies. Thus, access to housing finance and the distribution of income are key to determining households' ability to access a decent housing (Gan & Hill, 2009).

From this perspective, it is also important to define what quality of housing is appropriate for what income threshold. This can help to distinguish between those who face affordability problem because they willingly consume higher quality housing (apparent affordability) against households who are forced to consume sub-standards housing or spend above their appropriate housing bundle (actual affordability) (Kutty, 2005). In line with this study, I intend to explore how housing quality prescribed by some policies may affect actual affordability of households.

2. Income of households

Although the affordability concept is sometimes indiscriminately applied to all income groups, many authors tend to give special consideration to low and moderate-income people since they are the most burdened by excessive housing costs (Stone, 2006). More supporting arguments say that households within this income threshold are usually squeezed in their expenditure due to limited housing choices (Leishman & Rowley, 2012).

Moreover, it is particularly suggested that defining affordability should only take into consideration renters and first-time house buyers since affordability *per se* is less relevant to house owners who rather enjoy capital gains in periods of house prices/rents boom (Gan & Hill, 2009). In line with this, the analysis of affordability under this research particularly focuses on renters and first time house-buyers with low and moderate-income.

3. Housing prices/costs

The existing scholarly work on housing economics acknowledges the institutional implications in the housing market. Mayo et al. (1986) argue that in most contexts especially in developing world, housing is defined as a physical entity that needs to be established as per standards to fit in a broader spatial plan of a specific urban setting. However, such view of housing is widely considered as inadequate due to the neglect of the underlying social and economic conditions.

Perceptions of housing as a 'physical entity' and a 'commodity' rather than a 'social asset' have gained more grounds especially with governments' increased retraction from provision of housing in the past and its role gradually becoming instead that of regulating housing markets (Smets et al., 2014). For example, clearance of informal housing has been often undertaken in the name of market formalisation and city beautification. Yet, it largely leads to high house prices/rents with the urban poor facing renewed threats of shelter poverty.

3.2.2 Zoning regulations and affordability

Land use regulation by zoning can be beneficial and have positive impacts on smooth urban growth. Different standards under zoning can help to enhance safety and efficient use of space. On the other hand, critiques of zoning links it to decreased affordability as was repeatedly demonstrated in cases of the US (Harney, 2009; Glaeser & Gyourko, 2002), Malaysia (Malpezzi & Bertaud, 2001), Cameroun (Njoh, 1995) among others. Hence, a detailed synthesis of the literature suggests that zoning links affordability in one or more of the following ways.

The literature suggests that enforcing zoning generates high house prices. This often takes place through imposition of standards, which in turn makes production of housing more expensive (Monkkonen, 2013). Consequently, this raises prices of finished houses. In the global south, where house building heavily rely on individual household's efforts on an incremental basis (Smets et al., 2014), such standards makes access to housing less affordable to the poor. Furthermore, with such standards largely requiring use of non-local building materials, their enforcement encourages development of high-end market housing.

Also, it is theorised that strict land use regulation can affect affordability by causing irregularities in the housing market. Zoning regulations requirements decrease the activity level of construction sector, hence reducing the market ability to respond effectively to the demand (Malpezzi & Mayo, 1997). One potential cause is arguably that land use regulation increases the risks of the developer through charged fees or other uncertainty faced during the process of securing construction approval (Mayer & Somerville, 2000). Thus, given that the final house price depends on developers'

responsiveness on changes in demand (Malpezzi & Mayo, 1997), any reluctance by the latter can result in considerable supply cut and hence leading to high house prices. To this end, high house prices cannot be only explained by increased demand or rapid urbanisation, rather there is an implication of slow supply response as a result of complex and excessive land use regulation.

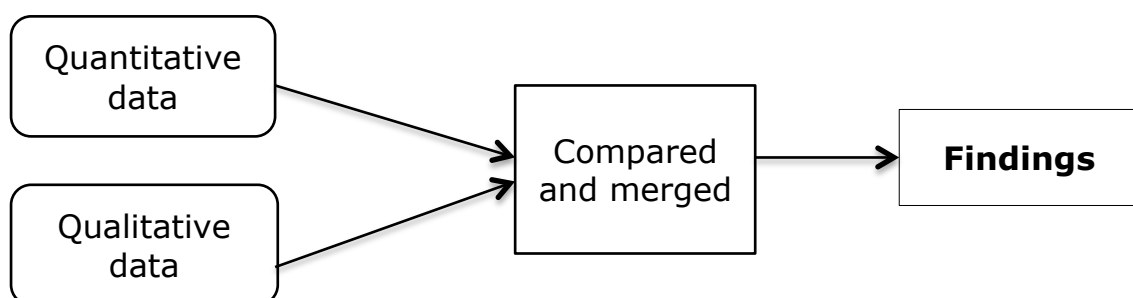
From literature, it is clear that zoning and affordability are two closely linked concepts yet applied and interpreted differently in various contexts. From a broad spectrum of literature consulted under this research, it is hard to say whether strict land use regulations are a simple reflection or a direct cause of underlying housing affordability problem. Therefore, I suggest that a thorough analysis of the political, social and economic background in particular context is crucial in order to answer this question. Based on this rationale, this study seeks to investigate whether there is any causality between master plan and zoning regulations and the affordable housing problem in Kigali city or whether this would rather be simply seen as an assumption.

3.3 RESEARCH STRATEGY

This research applies mixed-methods, which relates to the analysis of social, economic and spatial phenomena. This study analyses only secondary data. In addition, it uses both quantitative and qualitative data gathered from secondary sources including: textbooks, academic journals, working papers, organisation reports, policy documents and laws and other common forms of publications. The analysis component of this research applies *Discourse analysis* (Potter & Wetherell, 1994) and *cost analysis* (Mayer & Somerville, 2000).

Mixed-methods approach suits the nature and context of this study (figure 3.1). Use of multiple methods approach can help to neutralise biases inherent in individual methods, while also it allows easy triangulation of different data sources (Creswell, 2003). In this study, qualitative research helps to understand perspectives of policies, laws and plans on access to housing, whereas quantitative research offers an account on the extent of affordable housing problem and how it relates to current policy and regulatory frameworks. More precisely, as Bryman (2016) suggests, in this study qualitative data is used to illustrate quantitative findings.

Figure 3.1: Mixed methods research design



Source: Based on Creswell and Plano (2011) cited in Bryman (2016, p.639)

In addition to a detailed literature review, this study relies on the case study analysis. A case study analysis provides the researcher with ability to explore in depth a process in its real life context to generate a richer understanding, which could be adapted in the general context (Creswell, 2009; Yin, 2003).

Kigali city is a compelling case study to investigate the relationship between master plan and zoning enforcement and the affordable housing problem. With this city having experienced noticeable changes in terms of urban development and planning policies over the last two decades, this study is driven by the curiosity to understand how these shifts have affected provision and access to affordable housing.

3.4 DATA COLLECTION

Data for this dissertation were gathered from a vast literature and previous studies related to the research topic. These include both quantitative and qualitative data in textbooks, academic journals in planning and urban economics, organisation reports, etc.; whereas data regarding the case study were mainly collected from government reports, policy documents, laws, working papers, journals and other relevant sources.

Secondary data constitutes an essential part of data collection and they can be processed and analysed to generate results. This argument is supported by Burgess et al. (1988 in Farthing, 2016, p.151) who argue that qualitative data and quantitative data can be generated from various sources including text from a wide range of documents and datasets kept in different databases.

3.5 DATA ANALYSIS

Discourse analysis is a qualitative method, which uses language as way to understand the social world (Potter & Wetherell, 1994). Furthermore, Farthing (2016) argues that by using discourse analysis researchers are interested in how language is used in specific contexts and what 'version of the world' is generated. Thus, in the case of this research, various documents related to the case study were examined to understand the kind of the world they exhibit compared to the situation on the ground.

One other hand, many empirical researchers have applied *cost analysis* to explore changes in new build house costs/prices over time (Mayer & Somerville, 2000; Glaeser & Gyourko, 2003). In line with this study, this approach gathers data on material costs, labour and land to determine the total building cost for the cheapest standard residential unit. With this, the aim is to observe how costs changes as a result of enforcing master plan and zoning ordinances. The obtained data is in turn compared to the median income within the case study area to detect the affordability gap.

In order to do trace the potential linkages between enforcement of master plan and zoning regulations and the affordable housing problem, a detailed analysis is undertaken against pre-set key indicators for the case study area (Table 3.1).

Table 3.1: Key indicators and corresponding variables

Indicators	Variables	Data type & sources	Analysis
1. Policy and regulatory frameworks	<ul style="list-style-type: none"> Historical background of planning policies & laws in post 1994 and their perceptions on housing 	Qualitative data: Policies and laws.	Discourse analysis
2. House market situation	<ul style="list-style-type: none"> Estimated demand and supply Government interventions vis-à-vis affordable housing 	Quantitative & Qualitative data: Reports and policies.	Discourse & Cost analysis
3. Building standards and costs/prices	<ul style="list-style-type: none"> Building standards/zoning requirements vs. minimum housing unit costs, house price index 	Qualitative & Quantitative data: Laws, policies and reports.	Discourse & Cost analysis
4. Income of households	<ul style="list-style-type: none"> Income levels, Poverty & inequality, employment and extent of access to finance 	Qualitative & Quantitative data: Census data and reports.	Discourse analysis & Cost analysis

3.6 ETHICAL CONSIDERATIONS

This research does not involve any issues that could potentially lead to major ethical risks because it does not involve any primary data collection from participants. However, for further mitigation, an 'Ethics and Risk Assessment Statement' was signed following a request by the University of Manchester.

3.7 RELIABILITY, VALIDITY AND RESEARCH LIMITATIONS

Reliability and validity are key quality indicators of research. Reliability and validity involve a process of developing strategies to check accuracy and credibility of the findings. In qualitative research, reliability ensures that the researcher's approach is consistent with those employed by other researchers and other research projects (Gibbs, 2007). Thus, as recommended by Yin (2003) this research has employed documentation of all procedures of the case study as a strategy to ensure reliability.

On the other hand, Creswell (2009) defines qualitative validity as use of specific procedures by the researcher to check for the accuracy of the findings. In this research, I have employed triangulation of multiple sources of data by carefully scrutinizing evidences from various sources to build coherent justification for arguments (Creswell, 2009).

Also, it is important to note that due to different factors beyond control of the researcher, this research undertaking has encountered some limitations:

To start with, this research has significantly relied on secondary data and no primary data was collected. Yet Gatrell et al. (2012) argue that primary data gives the researcher sufficient knowledge of potential error and bias and (s)he can control all aspects of data processing. As a result, lack of primary data can reduce coherence of a study (Hox & Boeijs, 2005). Furthermore, this research was hindered by inadequate secondary data on the case study given that only a limited number of scholarly works is available on the topic area.

4. CASE STUDY ANALYSIS

4.1 OVERVIEW OF THE CASE STUDY AREA

4.1.1 Physical characteristics

Kigali is the capital and the largest urban centre in Rwanda. It is geographically situated slightly south of the Equator between 29°43'0"E and 29°44'0"E of Longitude and 2°35'0"S and 2°37'0"S of Latitude (REMA, 2013). The city spreads on hilly landscapes and valleys. The highest elevation is 1,600m and the valleys are situated at 1,300m above sea level (Nduwayezu, 2015). With Wetlands and steep slopes occupying approximately 19 per cent and 31 per cent of the city's area respectively (City of Kigali, 2013), only one third of land area is suitable for development. This constitutes a major physical constraint to the city's spatial development (Figures 4.1& 4.2).

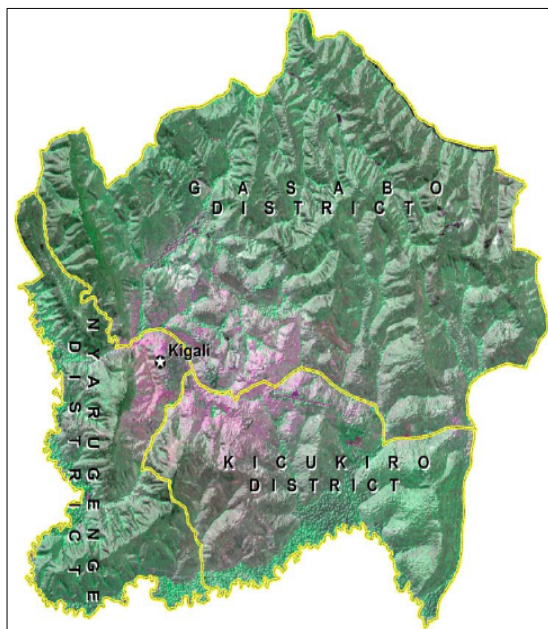


Figure 4.1: Satellite view of hilly terrain of the city of Kigali. Source: REMA (2013).



Figure 4.2: Satellite image of the built area of Kigali 2012. Source: Planet consortium (2012)

The city of Kigali currently extends on total area of 730 sq.km and following the administrative reform of 2005³ the city is subdivided into 3 districts namely: Gasabo, Nyarugenge and Kicukiro (Figure 4.3). These are in turn subdivided into 35 sectors, also subdivided into 161 cells and finally subdivided into 1,061 *Imidugudu* or villages (the lowest administrative entity).

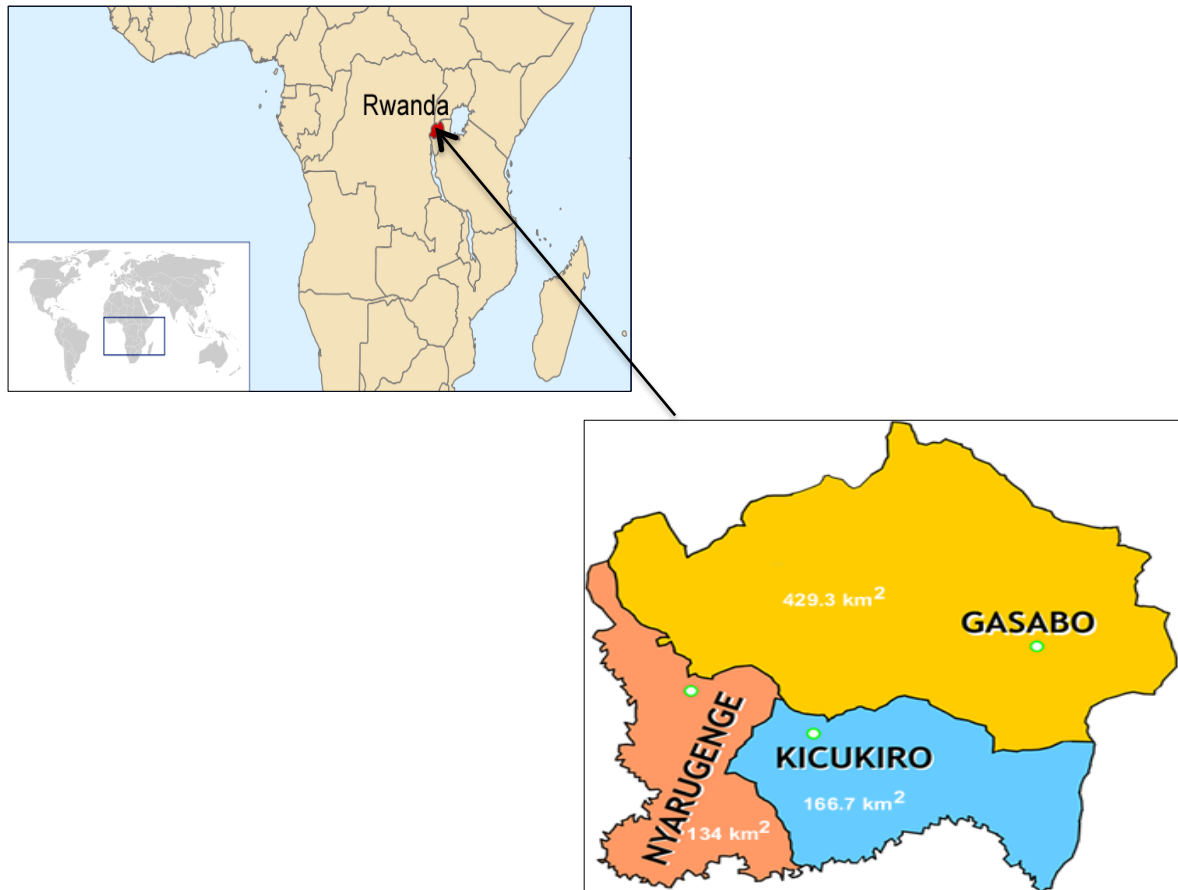


Figure 4.1: Administrative map of Kigali city. Source: City of Kigali (2012)

³ The organic Law No.29 of 2005 have set new administrative boundaries across Rwanda, which has seen the area of the city of Kigali expanded from 314 sq.km to 730 sq.km (Manirakiza, 2012).

Following boundary extension in 2005, a larger portion of the city remains rural mainly towards the Northern-East fringes. The urban area occupies only 12.1 per cent compared to 87.9 per cent rural (Nduwayezu, 2015). The main urban land uses include residential, commercial, industrial and government infrastructure with residential covering the largest area of 9.2 per cent (Table 4.1). On the other hand, agriculture land occupies the largest portion of the city's land use with 60.5 per cent (REMA, 2013) and forms mainly the area annexed to the city in 2005.

Table 4.1: Land use categories by proportion in Kigali city

Land Use Type	Area (Sq.km)	Per cent (%)
Public Facilities	12.2	1.7
Commercial	2.7	0.4
Government	4.2	0.6
Forest	77.2	10.6
Agriculture	442	60.5
Industry/Quarry	2.9	0.4
Residential	66	9.2
Mixed Use	0.2	0.03
Recreational/Vacant Space	10	1.4
River/Lake	1.6	0.2
Infrastructure	20.5	2.8
Wetland	91.6	12.5
Total	730	100

Source: Adapted from REMA (2013, p.7).

4.1.2 Demographic characteristics

The population of Kigali city has grown drastically since the independence of Rwanda in 1962. This has risen from 6,000 residents in 1962 to 1.3 million residents by 2013 (City of Kigali, 2013)(see table 4.1). Beyond the natural population growth, such rapid increase of the population was fuelled by rural-urban migration⁴. With Kigali being the principal administrative and commercial urban centre, it has constantly remained the focus for both businesses and employment seekers. Therefore, it accumulates 67 per cent of the country’s urban population. Apart from this, boundaries of Kigali have been repetitively expanded under a series of administrative reforms⁵, which also contributed to the population upsurge.

Table 4.2: Population and area changes in Kigali between 1960-2013

Year	Population	Area (sq.km)
1960	6,000	2.5
1978	117,749	112
1991	235,664	112
1994	350,000	112
2000	605,000	112
2005	851,024	349
2006	930,000	349
2012	1,135,428	349
2013	1,300,000	730

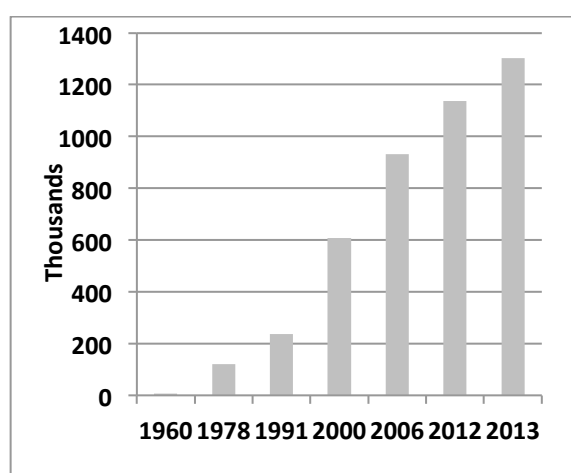


Figure 4.2: Population growth in Kigali city. Source: REMA (2013).

⁴ During 2007-2012 period the proportion of migrant population in Kigali increased from 19 to 27% and work was found as the main reason for migration (MININFRA, 2013).

⁵ In 1979, a decree law No. 11/97 of 27/04/1979 ordered the creation of urban area extending to 112 sq.km, which was expanded to 349 sq.km in 1990 by the presidential order No. 896/90/of 27/11/1990. This was again expanded to the current area of 730 sq.km by the organic law No.29 29/2005 of 31/12/2005 (Manirakiza 2012; Nduwayezu 2015).

In this context, the population of Kigali city have increased by nearly 50 per cent between 2002 and 2012 (NISR, 2012). While also the annual growth rate stands at 9 per cent, Kigali is reportedly among the rapidly growing cities in the region and on the continent. Thus, under current trends the city is expected to accommodate 5 million people by 2020 (City of Kigali, 2013). However, the major concern constantly remains how does/will Kigali city planning framework in force facilitate provision of adequate and affordable housing to accommodate such population growth within the existing environmental, political and socio-economic constraints. Following section provides a detailed discussion of findings to answer this question.

4.2 FINDINGS AND DISCUSSION

4.2.1 Policy and regulatory frameworks

In Rwanda, the post-genocide period was marked by rapid urban urbanization mainly taking place in Kigali city. In the presence of transitional institutions and poor infrastructure, urban growth has consequently taken place in spontaneous and uncontrolled manner (Manirakiza, 2012). As a result, this has given way to the spread of informal settlements. However, as part of the efforts to redress this situation, the central government has passed series of policies, laws and strategic plans to ensure urban renaissance and controlled spatial development. These are examined in detail under this section in attempt to capture their perceptions on provision and access of affordable housing (Table 4.1).

Table 4.3: Urban development policies, laws and plans for Kigali city

Policy/law/plan	Year	Objective	Affordable housing context
<i>A. Policies</i>			
(1) Land Policy	2004	It provides a broad national guide to land reforms and land management practices in Rwanda (MINITERE, 2004)	<p><i>"It acknowledges the need to diversify availability of developable plots to accommodate anticipated urban growth. Also favourable environment for access to finance and affordable building materials will be created and supported"</i> (p.39).</p> <p>However, it does not stipulate available mechanisms to unlock supply of land for housing and at what spatial scale would this be done.</p>
(2) National Human Settlement Policy	2009	From urban sector context, this policy seeks to improve settlement conditions of the urban population in consistency with EDPRS I (MININFRA, 2009)	<p><i>"Rehabilitation of residential areas gives priority to the security of residents through approaches such as rehousing"</i> (Strategy 2.2, p.19).</p> <p>However, over the past 10 years only a single expropriation scheme involved a rehousing option for the affected households in Kigali city.</p>
(3) National Urban Housing Policy	2015	To ensure adequate living conditions, to enable all residents to access housing, and to establish and anchor both objectives within national policies and programs (MININFRA, 2015).	<p><i>"For a housing development scheme to be considered affordable, it shall offer such types of units, which are in accordance with the real income structure in the concerned area. As an indicative orientation access to housing is considered affordable, if about a third of the income is spent on it"</i> (Policy pillar1, p.16).</p> <p>This definition is inadequate in a sense that it does say nothing about the quality of housing for what income level and tends to consider affordability as a problem to all people irrespective of whether they were renters, first home-buyers or owner-occupiers.</p>

<i>B. Laws</i>			
(1) Expropriation law	2009	This Law determines procedures relating to expropriation in the public interest (Republic of Rwanda, 2015).	<p><i>"Activities of public interests include those undertaken to implement land use and development master plans"</i> (Art.5).</p> <p>There is no precision on how the expropriated households would be facilitated to access housing. Also, activities stated in Article 5 are broad and can involve private interests not necessarily benefiting the wider community and the law does not explain whether affected residents have rights to object proposed development.</p>
(2) Land use planning law	2012	This Law contains provisions governing the planning of land use and development in Rwanda (Republic of Rwanda, 2012).	<i>"The land use mode may only be changed with the approval of the competent authority and it is done through a written application"</i> (Art. 10& 11)
(3) Condominium law	2010	This Law creates and organises condominiums and sets up procedures for their registration (Republic of Rwanda, 2010).	<p><i>"Condominium: a type of joint ownership of real estate in which portions of the property are commonly owned and other portions are individually owned"</i> (Art.2).</p> <p>It supports the efforts of individuals to collectively buy/build and own units within a single building. This can boost housing supply.</p>
(4) Land law	2013	This Law determines modalities of allocating, acquisition, transfer, use and management of land in Rwanda (Republic of Rwanda, 2013).	<p><i>"Land is considered not properly exploited when it is meant for buildings and/or infrastructures is not developed within the period prescribed by competent authority"</i> (Art.41).</p> <p>When it is not developed within this period (3 years) in accordance with the existing plans, it is subject to confiscation by authority. This could be a challenge for poor households who might not have financial capacity to meet costs associated with prescribed building standards within this period.</p>

<i>C. Plans</i>			
(1) Vision 2020 (2002-2020)	2002	Vision 2020 is a national long-term multi-sectorial strategic plan with a number of objectives relevant to urbanisation and human settlement (Ministry of Finance, 2000)	<p><i>"It sets out strategies to avoid uncontrolled growth by a coordinated planning, and to provide access to basic infrastructure services, such as shelter, electricity and drainage. It relates urbanisation to economic growth."</i> (Pillar No.4)</p> <p>However, rapid urbanisation without corresponding development rather causes chaos. In the city of Kigali, housing shortages could not be seen an insignificant symptom.</p>
(2) EDPRS I & II	2008	Economic Development and Poverty Reduction Strategy (EDPRS) is a mid-term sectorial strategic plan. Phase I was valid between 2008-12 and phase II between 2013-2017 (MININFRA, 2013).	<p><i>"The local governments are responsible for the management of development and urban growth, but are still weak and insufficiently staffed [...]"</i>.</p> <p>Although, this is a strategic assumption under EDPRS2, practically this forms a potential constrain to building permitting process, which tends to be costly and in some cases lengthy.</p>
(4) Kigali city Master plan	2013	It is based on initial conceptual master plan developed in 2007, and forms a broad roadmap for spatial development of the city and features individual physical plans for each district (City of Kigali, 2013)	It contains detailed land use and zoning plans that will guide the city's anticipated urban design. The housing context of the Master plan is analysed in details under theme 3.

The national housing policy acknowledges access to housing as a basic right for every citizen (MINIFRA, 2015, p.12). In addition, the legal frameworks that surround land use management and planning supports individuals' rights to exploit and use land according to the existing plans, which is arguably done in the interests of meeting the master plan objectives. However, also it is clear from policies, laws and plans discussed earlier that there is little demonstration of how they go about supporting access and supply of affordable housing.

In this way, the past experience has shown that where expropriation was undertaken within Kigali, rehousing options were rarely considered. Neither does the expropriation law consider house deficits potentially caused by proposed development. On the other hand, the land law does not put it clear whether incremental housing development usually preferred by low-income households would be still permitted should construction works take longer than 3 years prescribed by the law to escape confiscation.

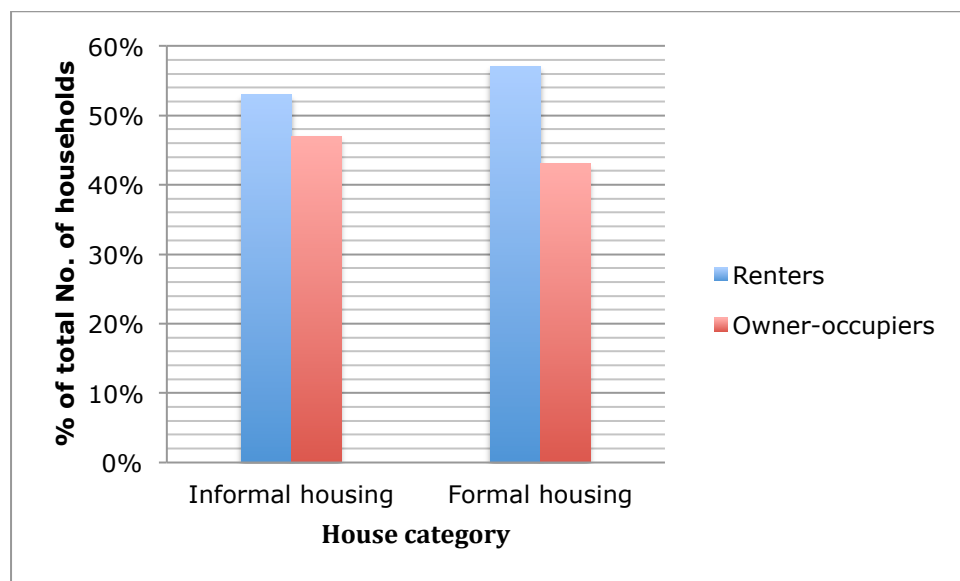
In addition, how the housing market reacts to the policy and regulatory frameworks in place could be another important question. This leads us to subsequent section, which reviews the existing housing situation within Kigali with a detailed discussion on the nature and scale of the affordable housing problem and state interventions.

4.2.2 House market situation

1. House market composition

In Kigali, house market is mainly broken up into rental housing and owner-occupation housing. Renters form the largest proportion of Kigali residents accounting for 53 per cent compared to 47 per cent for owner-occupiers (MININFRA, 2015). Most of the renters consume informal housing with a share of 57 per cent of the total tenant households in informal areas. With the majority of renting tenants (approximately 83%) housed in areas located around the central business district, these very same locations are the most likely to undergo expropriation in the process of enforcing the master plan.

Figure 4.3: Housing tenure structure for the city of Kigali



Source: MININFRA (2015). Elaborated by the author.

Unlike in Kigali, tenure structure at the country level is predominantly owner-occupation. The latter accounts for 80 per cent whereas renting households are only 15 per cent of total population (MININFRA, 2015). This is generally due to the availability of cheap labour, land and lack of building restrictions outer the urban boundaries, which in turn makes the housing cost largely affordable.

2. Extent of affordable housing problem

Housing shortages in Kigali have reached the highest record in the past two decades. In a housing market survey undertaken by Planet Consortium (PC) in 2012, it has revealed that Kigali needs at least 31,000 house units each year to satisfy current demand compared to only 1,000 units annual supply in the formal market. More importantly, the same study indicated that affordable housing constitutes the largest proportion of house demand corresponding to 54.11 per cent of the city’s population whereas mid-range housing, social housing and premium housing follow with 32.8%, 12.62% and 0.47% respectively (Table 4.4 & Figure 4.5).

	New Dwellings (Projections for 2012-22)	Dwelling units	%
1	Social Housing	43,436	12.62%
2	Affordable Housing	186,163	54.11%
3	Mid-range Housing	112,867	32.80%
4	Premium Housing	1,601	0.47%
	TOTAL	344,067	100%

Table 4.4: Projected housing supply for Kigali 2012-2020

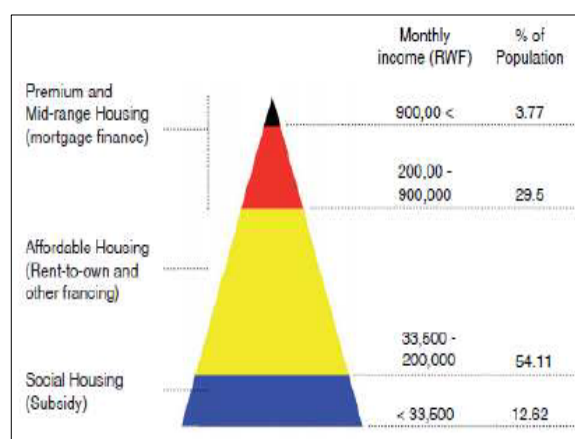


Figure 4.4 The pyramid of housing supply gap in Kigali. (Planet consortium, 2012).

Against this background, affordable housing is clearly among, if not the most ultimate challenge to the city's urban development vision. This is further demonstrated by how the issue is widely reported among international news outlets (see for example Rosen, 2015) and local media (Anangwe, 2016) with high-ranking government officials repeatedly quoted emphasizing that addressing the affordable housing issue is the city's prime focus.

Provision of affordable and adequate housing in Rwanda is an urgent issue and there is a need to bridge the gap between housing demand and supply for people in low and middle-income segments. Rwanda Minister of infrastructure (quoted in Byaruhanga, 2016, p.1)

In this respect, this study suggests that the causes of acute housing shortages in Kigali be viewed in two dimensions. One is the rapid and spontaneous growth of the city during the past two decades as was demonstrated in previous section. Second and most important is allegedly the mismatch between assumptions of the master plan and zoning requirements and the median average income of the city's households. To this end, before a detailed analysis of the latter cause is presented in the last two themes of this chapter, the next section offers a snapshot of the government interventions apropos affordable housing.

3. Government interventions

Much of the existing literature on housing strongly argues that government's approach to housing matters (Stephen et al., 1986; Dowall, 1996; UN HABITAT, 2011). In some cases, it has been revealed that misguided policies rather than solving, have contributed to the housing problem at scale (Angel, 2000). For example most of the prevalent large-scale public housing projects in the 20th century arguably failed partly as a result of misconception of the housing problem (Buckley, 2014).

In this way, Whitehead (2012) suggests that the housing problem should rather be positioned in the broad context of policy shifts, which dominated the past half-century. As most of governments shifted towards market liberalisation, so did their role vis-à-vis provision of housing. In this respect, these changes have seen the government becoming the enabler of the housing market while housing provision fell in the hands of the private sector (Smets et al., 2014).

In the context of Kigali city, the government essentially sees itself playing the intermediary role. The current the housing policy emphasizes the government role to enabling the private sector to exhaust the current and growing housing demand in terms of quantity and quality. Particularly, it advances a comprehensive multi-stakeholder approach to encourage more home building with following objectives (MININFRA, 2015, p.13):

- Enabling the private sector to satisfy the current and growing demand for housing in terms of quantities and access costs offered to clients;
- Supporting the purchase power among population through saving for housing, and pooling of individual resources;
- Supporting financing models accessible to the full range of residents including low income levels;
- To emphasize principles of quality and professionalism in both, planning and construction of neighbourhoods and housing; and
- To combine land, land use, urban planning and housing policy directions in order to achieve the efficient use of land and resources when developing housing.

Furthermore, the government recently passed two legal instruments in hopes to attract private developers' interests in affordable housing:

- (1) *Prime Minister instructions No. 004/03 of 13/09/2015 determining the conditions and procedures for obtaining government support for affordable housing projects:*

It sets out conditions under which the government would supplement affordable housing schemes by providing basic infrastructure. Also, it outlines the eligibility criteria, intended beneficiaries profiles and approval procedures to qualify for government support. Apart from this, there is a proposed Urban Development Fund, which will financially facilitate public infrastructure delivery and project screening and approvals (MININFRA, 2014).

(2) *Law N° 06/2015 OF 28/03/2015 relating to investment promotion and facilitation:*

It is part of the broad government strategy to incentivize private investments into affordable housing. It sets out the conditions for wide range of incentives provided to developers of affordable housing including tax relaxation (Republic of Rwanda, 2015b).



Figure 4.5: Batsinda Estates I. A single affordable housing scheme comprised of 250 units in Kigali. MININFRA (2014).



Figure 4.6: Proposed Batsinda Estates II comprised of 530 units. MININFRA (2014)

The current government efforts and planned interventions to support more affordable housing delivery reveal the magnitude of the problem and how it is treated diligently at all levels. However, the affordability concept has been occasionally either intentionally misused or unconsciously misinterpreted by both private and public institutions. There have been cases where mid-range housing proposals are categorised as 'affordable' in local marketing portals. For instance, a condominium apartment currently under construction was often labeled 'affordable' by the city officials and

developers (Figure 4.8). Yet the cheapest unit in this building is priced at Rwf⁶ 28 million (Agutamba, 2015), which is far away higher than the ceiling cost/price for affordable unit of Rwf 6.3 million recommended by the National Housing Policy (MININFRA, 2015).



Figure 4.7: Construction site of one of the residential developments labelled as 'affordable apartments'. Source: Agutamba (2015).

Unfortunately, it would be beyond the scope of this research to investigate whether such schemes wrongly qualify for government incentives under affordable housing label. Nevertheless, it is clear that lack of comprehensive definition for 'affordability' matching the local context in terms of house quality, costs and income level is a potential constrain to the existing interventions.

Under following section, this study relates housing cost to affordability by narrowly looking at the effects of the master plan and zoning regulations on the overall building cost in Kigali city.

⁶ 1GBP=1,062.73 Rwf (Rwanda National Bank, 2016)

4.2.3 Building standards and house costs/prices

1. Origin of master planning and zoning in Rwanda

In response to the issues of urbanisation, the city of Kigali embarked on a modernist approach to planning supported by the master plan and zoning regulations since 2002 (OZ Architecture, 2007). Developed in 2007 and approved by the parliament in 2008, the city's master plan supports segregation of land uses through zoning regulations. The latter are legally binding under the law relating to the planning of land use and development (Manirakiza, 2012). According to Kigali city, the master plan embodies a comprehensive guide of anticipated growth and development and forms the roadmap to the city's long-term aspiration to be the 'centre for urban excellence' (City of Kigali, 2013).

However, beyond the ambition to embrace modern urbanism and need to ensure efficient land use management, the influence of international planning cultures on Kigali's zoning system is equally significant. Very often, Kigali city officials and other senior government figures are quoted in media praising Singapore as a 'model' for Kigali.

Singapore beats Kigali by only three kilometres in size, but ably accommodates over five million people because it's well planned. The former mayor of Kigali city (quoted in Ngoboka, 2015, p.1)

Generally, Rwanda strongly believes in Singapore as a learning experience not only because the two tiny states share a common challenge of scarce land resources. But more importantly, because Singapore has known phenomenal economic growth over the past half-century (Tai-Chee et al., 2008). In this context, Rwanda shares similar vision under current mid-term and long-term strategic plans.

Let alone Rwanda, Singapore's urban development model has massively gained international recognition and particularly it has attracted interests of many governments in the global south (Shatkin, 2013).

We were impressed by Singapore's expertise in urban planning and how they have built an environmentally friendly city. Spokesman of city of Kigali (quoted in Kolesnikov-Jessop, 2010, p.1).

As a result, the early development of the conceptual master plan for Kigali was commissioned to a Singaporean planning firm 'Surbana' following a mutual agreement in 2008 to exchange expertise in planning and urban development. However, the literature review has strongly questioned the rationality of importing urbanism models. Although it is not within the scope of this study to develop further discussions about the propagation of any urbanism model in Rwanda, it is worth noting the role of Singapore urban model in the current urban planning reforms for Kigali city.

2. Cost implication of master plan and zoning on housing

The current master plan envisages what the Kigali's urban fabric should look like in the next 50 to 100 years embodied in detailed development frameworks for each of three districts. These are accompanied by zoning plans and regulations for each district. In the context of Kigali, "*zoning regulates the types of uses, the development intensity, the setting and height of buildings on any plot*" (Joshi, 2013, p.2). In brief, they mean to provide clarity regarding what can and cannot be permitted on individual plot.

In order to trace the cost implication of zoning on house development, this dissertation suggests cost analysis of building materials for informal⁷ housing typologies. In turn, these are contrasted with those of a typical house unit required by the zoning code. Thereafter, this section also highlights some features of the zoning regulations for Batsinda neighbourhood in Kigali city.

2.1 Cost analysis of informal housing typologies

The majority of these houses are built using individual financial means slowly over varying periods depending on the owner's capacity. They use largely locally available and relatively cheap building materials mainly including: mud bricks, rammed earth, timber, mud plaster and cement screed. Following table provides cost details for these materials.

Table 4.5: Material cost for an informal housing typology

Material	Cost (Rwf)	Unit
1 Mud brick	6,250	m3
2 Cement screed flooring	5,500	m3
3 Rammed earth walls, with timber struts	2,500	m3
4 Clay roofing tile	6,000	m3
5 Volcanic stone	36,000	m3
6 Timber including bamboo	1,000	piece (≈3m long)
7 Mud plaster	6,250	m3

Source: World Bank (2012). Elaborated by the author.

In addition, the labour required to build this kind of housing is widely available locally and at cheap cost. The estimated minimum building cost including land for single-family unit (3 bedrooms) is Rwf 9 millions using quotations in the table above (see appendix B). Practically, this housing type would be affordable to many of the

⁷ In this section 'formal' and 'informal' indicate what is permitted and what is not under the master plan and zoning code not necessarily relating to the general definition of informal settlement.

city's households, but there are prevalent disinclinations against them among policy-makers on grounds that they are non-modern and regressive (World Bank, 2012). As a result, they are not permitted under the current zoning code.

2.2 Cost analysis of formal house typologies

The master plan and zoning requires new forms of urban design at the city level. In addition, zoning regulations imply the use of durable materials as per building code. Also, these are required given that high-rise construction is highly encouraged by current master plan. Following table presents cost analysis of materials for a formal house unit as per zoning code.

Table 4.6: Material cost for a formal housing typology

Material	Cost (Rwf)	Unit
1 Reinforced cement concrete	350,000	m3
2 Plain cement concrete brick	86,250	m3
3 Hollow concrete block	28,215	m3
4 Fired brick	21,875	m3
5 Steel	230 to 1550	piece (diameter≤12m length)
6 Glass	7,000 to 18,000	m2 (thickness ≤ 8mm)
7 Aluminum doors and windows	90,000	m2
8 Granite tile	16,000	m2
9 Ceramic tile	8,500	m2
10 Marble	30,000	m3
11 Vitrified tiles	6,700	m2

Source: World Bank (2012). Elaborated by the author.

There is insufficient local manufacturing capacity for building materials and most of these are imported, hence reaching the country at higher costs. Furthermore, use of these materials can sometimes require the hiring of foreign skilled labour. Considering all these factors, the cheapest formal house unit (3 bedrooms) including land would cost approximately Rwf 16 millions (See appendix B), which is relatively expensive for the ordinary residents of Kigali city.

In addition to the cost analysis, this study suggests a review of a few features of the zoning plans and regulations for Batsinda neighbourhood in Gasabo district (Table 4.6). In this area, permitted uses are affordable low-rise residential and apartments. However, when you consider the required building coverage of 60% for landed housing and attached houses, it discourages horizontal in favour of vertical construction (Joshi, 2013). As a direct consequence, this necessarily implies the use of mostly imported and expensive materials (described in table 4.5). On the other hand, given that the average household size in Rwanda is 4.7 persons (NISR, 2012), the necessity for sufficient living space and zoning restrictions inevitably lead to higher building costs in this area.

Table 4.7: Excerpts of zoning regulations for Batsinda neighbourhood

Specification	Regulation
Zone	The low-rise residential district (R2A)
General description	The purpose of R2A District is to create an affordable low-rise housing district by allowing higher building coverage and higher intensity low-rise development in suburban new towns.
Permitted uses	<ul style="list-style-type: none"> • Low rise apartments • Townhouses
Minimum lot size	<p>Type 1: • Lot size of 90 m² for landed housing development, semi detached & attached houses</p> <p>Type 2: • Minimum lot size of 600 m² for multi-family apartments. All developments need to provide minimum of 90 Dwelling Units</p>
Building coverage	<ul style="list-style-type: none"> • 40% for apartment • 60% for landed house, attached houses
Maximum Floor Area Ration (FAR)	<ul style="list-style-type: none"> • 1.4 maximum
Existing buildings	<p>Additions and alterations necessary to retain an existing approved legally non-conforming building and its use in good order and repair will be allowed, subject to:</p> <ul style="list-style-type: none"> • No material change in use which does not comply with the prevailing zoning regulations; • No further increase in floor area of the existing non-conforming use • Any additional floor area required for the non-conforming use will: <ul style="list-style-type: none"> • Be subject to the evaluation and approval of the City of Kigali, One Stop Centre; and • Not to exceed 10% of the existing use

Source: Adapted from Joshi (2013, p.30).

Zoning regulations presented in the table above are supposed to support the development of affordable housing in Batsinda, which means that standards are more relaxed compared to other residential zones. At the same, it is important to recall that these areas (R2A) are suburban, yet the largest portion of low-income households live in areas surrounding the CBD⁸. This itself puts another dilemma in housing upgrading and resettlement programs outlined in the national housing policy. In the former case, it would require residents to restore their houses to the area zoning standards and from past experience low-income households have had few choices other than being expropriated and relocate to unknown areas. Another scenario where these residents are rehoused at the periphery in what is considered as affordable housing it turns to be added costs to commute to their employment. In other words, the affordability problem remains but only shift from housing to non-housing goods and services.

Following section provides a picture of the social and economic conditions within Kigali. Towards the end, this dissertation builds on these findings to provide a brief discussion on the extent of home ownership for various income groups.

⁸ Central Business District

4.2.4 Socio-economic conditions in Kigali city

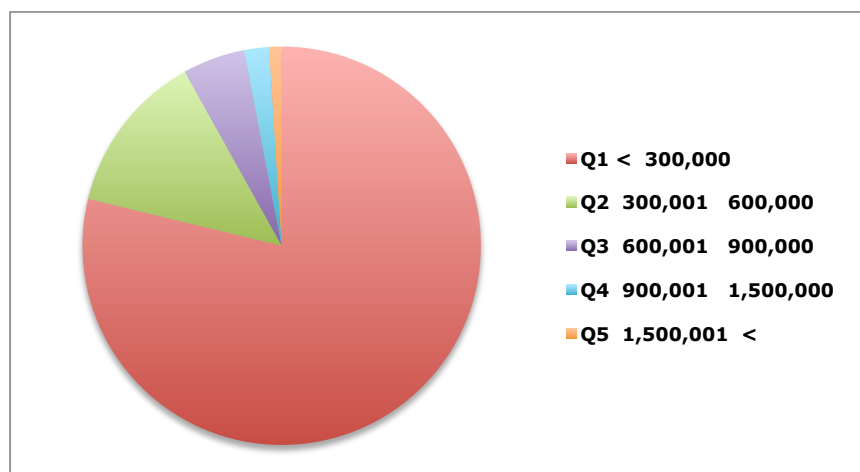
1. Households income

The largest portion of households in Kigali has a monthly income of less than Rwf 300,000 corresponding to 78 per cent of the total population. The latter falls in the first quintile (Q1). Whereas people in Q2 constitutes 13 per cent and they earn between Rwf 300,001 and Rwf 600,000. The following quintile (Q3) is comprised of people who earn between Rwf 600,001 and Rwf 900,000 and it forms 5 per cent. Q4 forms 2 per cent of total households and is comprised of people earning between Rwf 900,001 and Rwf 1,500,000. Finally, Q5 is comprised of households with monthly income above Rwf 1,500,000 and it constitutes 1 per cent of the city's population (see table 4.7 and Figure 4.9).

Table 4.8: Proportion of income quintiles

Quintile	Monthly HH Income (Rwf)		Proportion
	From	To	
Q1	<	300,000	78%
Q2	300,001	600,000	13%
Q3	600,001	900,000	5%
Q4	900,001	1,500,000	2%
Q5	1,500,001	<	1%

Figure 4.8: Proportion of households' income

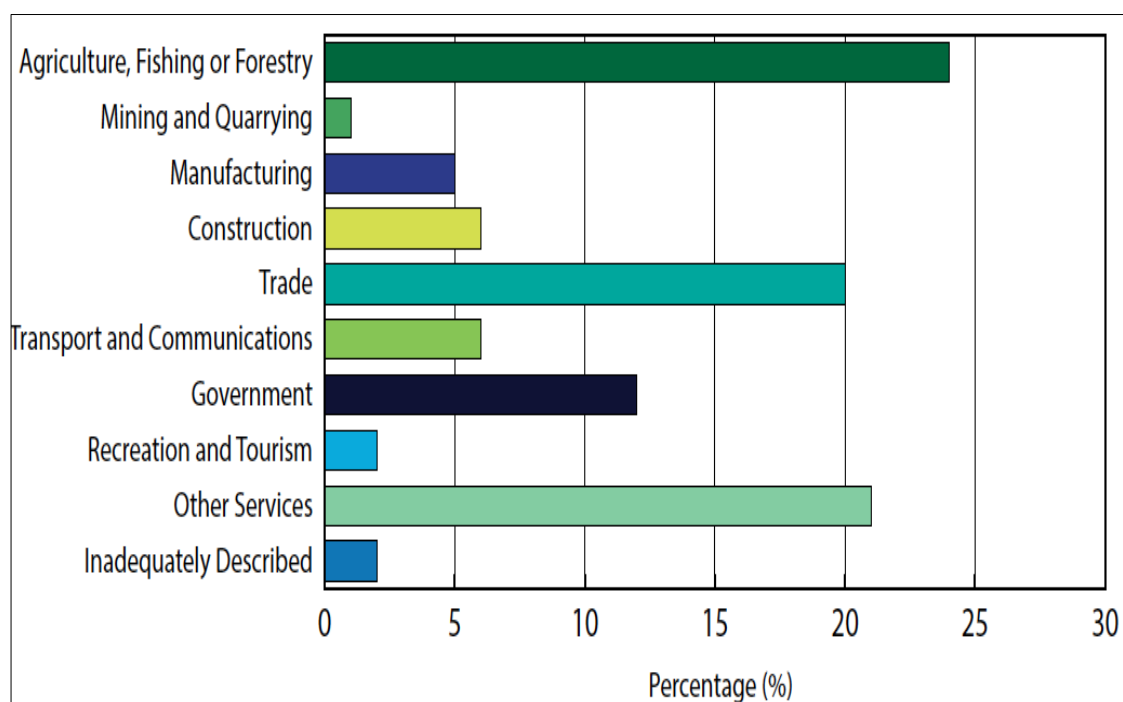


Source: Planet consortium (2012). Elaborated by the Author

2. Employment

Kigali being the main urban centre in Rwanda, it accumulates the largest share of employment. This is further characterised by the demographic structure of its population. About 73 per cent of residents are under the age of 30 (REMA, 2013) and this could be explained by high concentration of economic activities, which attracts young people to the city. To this end, the labour force⁹ in Kigali forms 79.3 per cent of the population (NISR, 2016b). The city's major employment sectors include agriculture (24%), tertiary sector such as utilities and financial services (21%) and trade forming 20 per cent. Other employment areas include public sector, transportation and communication, construction and manufacturing (see table 4.8).

Figure 4.9: Employment breakdown for Kigali city



Source: Adapted from REMA (2013, p.30)

⁹ Wage farm (4.3%), Wage non-farm (55%), Independent farmer (16%), independent non-farmer (21.1%) and Others (2.5%). Source: NISR (2016b).

On the other side of the spectrum, levels of unemployment in Kigali are on the rise. A recent countrywide pilot study on employment reported the unemployment rate of 13.2 per cent at the country level (NISR, 2016a). The same study indicates that unemployment rate is higher in Kigali and other urban areas (15.9%) compared to rural areas (12.6%). Also, higher unemployment rate is recorded among those aged between 16 and 30 (15.9%) compared to adults (10.6%). From these data, it is clear that unemployment threatens a huge portion of young and active population of the city.

3. Poverty and inequality

In the last 20 years a tremendous progress was made regarding poverty reduction. For example during the 2005-2011 period poverty has dropped by 11.8 per cent at the country level (NISR, 2012c). Despite this decline, however, poverty is still prevalent and widespread in both urban and rural areas. In general, 45 per cent live below the poverty line in Rwanda while in Kigali city poor population are 22 per cent (World Bank, 2015). From a geographical point of view, poverty is predominant in rural areas compared to urban areas. In addition, while agriculture¹⁰ is the leading source of income for the majority of the population, similarly high incidence of poverty is found among those relying on this occupation (NISR, 2012c).

On the other hand, inequality levels are generally high in Rwanda and mainly driven by location, education and occupation (World Bank, 2015). While the Gini coefficient at the national level stands at 50.8, urban areas records higher inequality (Gini of 58) compared to rural areas with Gini of 40 (World Bank, 2015).

¹⁰ At the country level, for 80% of poor households agriculture is the main source of income, which accounts for 60% of the total household income (World Bank, 2015).

As a result, this shows a huge discrepancy in terms of ability to access basic consumption goods including housing between those at the top and bottom end of income distribution particularly within Kigali city.

4. Extent of access to homeownership

Based on the literature review, housing affordability was defined in terms of capacity to buy/rent a house (purchase affordability) with own resources or ability to pay back loan services (repayment affordability). This section attempts to capture the extent of access to finance as a proxy measure of purchase affordability.

From the perspective of financial inclusion, in Kigali approximately 37 per cent of people hold a bank account and among these only 21 per cent have savings account (MININFRA, 2015). Also, at the national level only 4 per cent borrows money from formal financial institutions purposely to buy or build a dwelling unit (Finscope, 2016). To this end, access to finance and saving culture is clearly still at low level and does not consequently make it easy to access housing finance.

On the other hand, low-income levels among households further affect chances to access housing finance. The average wage in Kigali city is Rwf 223,527 with 73 per cent earning less than Rwf 300,000 (MININFRA, 2015). Yet, in order to borrow funds sufficient to buy or build a formal residential unit, it would require a minimum monthly income of Rwf 990,000 corresponding to less than 3 per cent of total households (Planet consortium, 2012). Apart from this, high interest rates¹¹ and difficult loan terms exclude low and moderate-income earners from formal housing finance.

¹¹ Average interest rate is 18% in local mortgage market.

Table 4.9: Purchase affordability in Kigali city

Average HH Income (Rwf)	Affordable house cost (Rwf)
< 300,000	6,300,000
Required HH Income	Actual formal house costs
990,000	≥ 20,000,000
4,935,000	≥ 100,000,000

*Assumption: 18% interest rate and 15 years loan term

Source: MININFRA (2015, p.8)

In this context, the cheapest subsidized house unit would cost Rwf 6.3 millions and this is the ceiling house cost within the reach of those with monthly income of less than Rwf 300,000 (see table 4.10). Therefore, in order for households within the first income quintile to access housing finance, it requires specialised finance mechanisms out of the traditional mortgage housing finance configuration because otherwise they are constrained by insufficient income to meet formal housing costs.

5. CONCLUSION

In this dissertation, I highlight the causal relationship between zoning based planning systems and declined housing affordability. I consider Kigali city, the capital of Rwanda as one of possibly many cases studies across African cities suitable for examining the linkages between master planning and zoning enforcement and the lack of housing options for low and moderate income urban residents. Previous studies assess the impact of land use and building restrictions and housing affordability and massively found a strong correlation between zoning strictness and rise in house costs and prices. The literature presents strong evidences from cities across the US, Brazil, Malaysia and Cameroun in Africa.

Also, in this dissertation I hint at the transfer of planning cultures as a major foundation of planning systems. In general, such diffusion of urbanism models takes place in wide context of transnational cooperation and exchanges of best practices in planning. Although the rationale behind this has been largely critiqued, it is not uncommon for cities to emulate developments believed to be success elsewhere with the hopes to make similar impact in these urban settings. In this way, in Kigali city the on-going planning reforms including the new master plan and zoning ordinances appear to be strongly influenced by the Singaporean urban model.

Reflecting back to the major aim of the dissertation, the intention is to trace the linkages between zoning and housing affordability. Findings from the case study illustrates that the city is committed to address the effects of uncoordinated urbanisation, which reigned its landscapes for many decades. This is reflected in the existing policy and regulatory frameworks, which encourage the city's authority to

undertake large-scale gentrification projects to meet the master plan's outlook and to get rid of informal settlements.

In terms of housing development, the master plan and zoning requirements are clear for different residential zones. However, there is a discrepancy between their assumptions and existing social and economic conditions, which as a result implies a huge cost implication on housing. With more than 73 per cent of the city's households earning as less as Rwf 300,000, such monthly revenue would only afford a house unit worth Rwf 6.3 million. Without subsidies there is nowhere in Kigali such amount can build a house, when a simplified cost analysis suggests that the cheapest unit required by the zoning code would at least cost Rwf 16 millions. Therefore, I would argue that despite the envisaged long-term benefits under current master plan and zoning code implementation, they don't respond adequately to the immediate housing needs of the low-income communities. Instead, they seem to further undermine traditional means of access to affordable housing by these income groups.

Assessing aspects of zoning planning and housing affordability is crucial in any urban setting and particularly in the case study area. Zoning planning has gained ground in countries with the increased need to segregate incompatible land uses and to control urban growth. On the other hand, while access to housing is largely recognized as a basic human right, similarly it forms the main household expenditure. Hence, a minimal rise in housing cost can make life in the city harder particularly for the poor with direct consequences likely to be consumption of either substandard housing or too expensive housing package.

In this context, it is theorised that zoning links to housing affordability by imposing restrictions in terms of use, height, materials, which increases the overall cost of housing and prices of finished houses. In turn, it reduces the level of construction for new houses. In the case study context, this is noticed where house typologies permitted under zoning largely require use of imported materials, labour and technology not locally available. In this situation, the poor can hardly afford the housing cost without subsidies, while high-end housing development burgeons only to benefit as less as 5 per cent.

This study assesses impact of zoning-based planning on housing affordability for the urban poor in Kigali city. It notices a rise in the cost of housing as a result of the implementation of the master plan and zoning. With the city becoming increasingly short of affordable housing, the government is intervening in different ways to fill the gap. Although the government's role towards housing remains being an enabler, there is evident need for direct involvement in housing development to meet the growing demand in Kigali city.

In addition, one more important factor to access decent housing is households' income. While the majority of residents of Kigali city are constrained by income and, only a small proportion can access mortgage loans. In this case, there is need to develop alternative housing finance mechanisms to facilitate those in lower-income blankets to access funds under more flexible terms.

In order to contribute to the knowledge in this area of study, further research applying econometrics methods can be done to capture with more precision changes in housing costs and prices as a result of restrictions of the master plan and zoning ordinances in force. Also, further research is needed in this area to establish a database

for housing affordability and to adapt this concept to the context of Kigali. This could serve as basis to identify beneficiaries of future affordable housing projects and to monitor affordability indexes as an important indicator for quality of life within Kigali city.

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Appendices

Appendix A: Procedures for to obtain building permit in Kigali

1. Requirements:

- A cover letter addressed to the district mayor
- Land title for the proposed development site (1 copy)
- Development proposal in A3 format containing the following:
 - Floor plan, perspectives, cross-section, facades;
 - Implementation plan
 - Septic tank design
 - Electrical & plumbing plans
 - Bills of quantities
 - Project timeline
- Deed plan (2 copies)
- Proof of payment fees for building permit

2. Steps to obtain construction permit

Step #1: Pre-application consultation meeting:

This is an optional step for small-scale projects like single-unit residential development. However, in the latter case applicant is still recommended to consult the relevant district one stop center¹² to obtain necessary information regarding permitted uses on the proposed site;

Step #2: Application

This step involves mainly preparation and submission of all required documents (described earlier) accompanied by application form to the district/city one stop center;

¹² Available at each district level and at the Kigali city council, they are specialized departments in charge of enforcing master plan and issuing construction permits.

Step #3: Site inspection

Technical staff from the district/city council one stop center visits the proposed site to inspect conditions and to check potential development impacts. More inspections can still be undertaken during construction period to verify if the development is undertaken as per approved plan;

Step #4: Issue of the permit

Once the district/city technicians return to office, they evaluate the development proposal and communicate the to the applicant the status of application.

According to the city of Kigali, this process is estimated to take maximum 20 days. However, this often depends to the size and urgency of the project. For example this process tends to be fast when it is a large project in the wide scope of attracting investments in the country but it can susceptibly take similar time for a single-family house development application.

Appendix B: Cost estimation for formal and informal dwelling units in a sub-urban area (i.e Batsinda neighbourhood)

A. Estimated land acquisition and construction costs for the cheapest informal house typology in a sub-urban area (R2A)

No.	Description	Unit	Qty	Cost/unit	Total
I. Site acquisition and building permit costs					
1	Estimated land price	m2	90	30,000	2,700,000
2	Title transfer costs	Rwf		45,000	45,000
3	Building permit costs (cost of plans included)	Rwf		186,000	186,000
	S/TOTAL				2,931,000
II. House building costs					
1	Estimated construction cost/sqm	Rwf	1	80,000	80,000
2	Estimated built-up area for 3 bedroom unit	m2	1	76	76
	S/TOTAL				6,080,000
	TOTAL				9,011,000

B. Estimated land acquisition and construction costs for the cheapest formal house unit in a sub-urban area (R2A)

No.	Description	Unit	Qty	Cost/unit	Total
I. Site acquisition and building permit costs					
1	Estimated land price	m2	90	30,000	2,700,000
2	Title transfer costs	Rwf		45,000	45,000
3	Building permit costs (cost of plans included)	Rwf		186,000	186,000
	S/TOTAL				2,931,000
II. House building costs					
1	Estimated construction cost/sqm	Rwf	1	185,000	185,000
2	Estimated built-up area for 3 bedroom unit	m2	1	76	76
	S/TOTAL				12,950,000
	TOTAL				15,881,000

Note: Quotations are partly drawn from World Bank (2012). Whereas others such as estimates for land prices, land acquisition costs and construction permit costs were collected from an independent real estate consultant operating from Kigali. Plot and location for both housing typologies are assumed identical.